

Appl. No. : 09/966,389
Filed : September 27, 2001

wherein the alloy has a tensile strength of 800 N/mm² or more.

5. (Amended) A high-mechanical strength copper alloy, consisting essentially of 3.5 to 4.5% by mass of Ni, 0.7 to 1.0% by mass of Si, 0.01 to 0.20% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and further 0.005 to 2.0% by mass in the sum total of at least one element selected from the group consisting of 0.005 to 0.3% by mass of Ag, 0.005 to 2.0% by mass of Co and 0.005 to 0.2% by mass of Cr, and less than 0.005% by mass (including 0% by mass) of S, with the balance being made of Cu and inevitable impurities,

wherein a diameter of a crystal grain in the alloy is from more than 0.001 mm to 0.025 mm; and the ratio (a/b), between a longer diameter a of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter b of a crystal grain on a cross section perpendicular to the direction of final plastic working, is 1.5 or less, and

wherein the alloy has a tensile strength of 800 N/mm² or more.

Please cancel Claims 3 and 7.

Please add the following new Claims 9-19:

9. The high-mechanical strength copper alloy as claimed in Claim 1, wherein the alloy consists essentially of 3.5 to 4.0% by mass of Ni, 0.75 to 0.95% by mass of Si, 0.03 to 0.20% by mass of Mg, 0.05 to 1.0% by mass of Sn, 0.2 to 1.0% by mass of Zn, and less than 0.002% by mass (including 0% by mass) of S, with the balance being made of Cu and inevitable impurities.

10. The high-mechanical strength copper alloy as claimed in Claim 5, wherein the alloy consists essentially of 3.5 to 4.0% by mass of Ni, 0.75 to 0.95% by mass of Si, 0.03 to 0.20% by mass of Mg, 0.05 to 1.0% by mass of Sn, 0.2 to 1.0% by mass of Zn, and further 0.005 to 2.0% by mass in the sum total of at least one element selected from the group consisting of 0.005 to 0.3% by mass of Ag, 0.005 to 2.0% by mass of Co and 0.005 to 0.2% by mass of Cr, and less than 0.002% by mass (including 0% by mass) of S, with the balance being made of Cu and inevitable impurities.

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11. The high-mechanical strength copper alloy as claimed in Claim 5, wherein the alloy consists essentially of 3.5 to 4.0% by mass of Ni, 0.75 to 0.95% by mass of Si, 0.03 to 0.20% by mass of Mg, 0.05 to 1.0% by mass of Sn, 0.2 to 1.0% by mass of Zn, and further 0.005 to 1.25% by mass in the sum total of at least one element selected from the group consisting of 0.005 to 0.15% by mass of Ag, 0.005 to 1.0% by mass of Co and 0.005 to 0.1% by mass of Cr, and less than 0.002% by mass (including 0% by mass) of S, with the balance being made of Cu and inevitable impurities.

12. A high-mechanical strength copper alloy, consisting essentially of 3.5 to 4.5% by mass of Ni, 0.7 to 1.0% by mass of Si, 0.01 to 0.20% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and less than 0.005% by mass (including 0% by mass) of S, with the balance being made of Cu and inevitable impurities,

wherein a diameter of a crystal grain in the alloy is from more than 0.001 mm to 0.025 mm; and the ratio (a/b), between a longer diameter a of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter b of a crystal grain on a cross section perpendicular to the direction of final plastic working, is 1.5 or less,

wherein the alloy has a tensile strength of 800 N/mm² or more, and
wherein the alloy does not contain carbon.

13. The high-mechanical strength copper alloy as claimed in Claim 12, wherein the ratio (a/b) is between 0.8 and 1.5.

14. A high-mechanical strength copper alloy, consisting essentially of 3.5 to 4.5% by mass of Ni, 0.7 to 1.0% by mass of Si, 0.01 to 0.20% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and less than 0.005% by mass (including 0% by mass) of S, with the balance being made of Cu and inevitable impurities,

wherein a diameter of a crystal grain in the alloy is from more than 0.001 mm to 0.025 mm; and the ratio (a/b), between a longer diameter a of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter b of a crystal grain on a cross section perpendicular to the direction of final plastic working, is 1.5 or less,

wherein the alloy has a tensile strength of 800 N/mm² or more, and

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wherein the alloy does not contain carbon and molybdenum.

15. The high-mechanical strength copper alloy as claimed in Claim 14, wherein the ratio (a/b) is between 0.8 and 1.5.

16. A high-mechanical strength copper alloy, consisting essentially of 3.5 to 4.5% by mass of Ni, 0.7 to 1.0% by mass of Si, 0.01 to 0.20% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and further 0.005 to 2.0% by mass in the sum total of at least one element selected from the group consisting of 0.005 to 0.3% by mass of Ag, 0.005 to 2.0% by mass of Co and 0.005 to 0.2% by mass of Cr, and less than 0.005% by mass (including 0% by mass) of S, with the balance being made of Cu and inevitable impurities,

wherein a diameter of a crystal grain in the alloy is from more than 0.001 mm to 0.025 mm; and the ratio (a/b), between a longer diameter a of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter b of a crystal grain on a cross section perpendicular to the direction of final plastic working, is or less 1.5,

wherein the alloy has a tensile strength of 800 N/mm² or more, and

wherein the alloy does not contain carbon.]

17. The high-mechanical strength copper alloy as claimed in Claim 16, wherein the ratio (a/b) is between 0.8 and 1.5.

18. A high-mechanical strength copper alloy, consisting essentially of 3.5 to 4.5% by mass of Ni, 0.7 to 1.0% by mass of Si, 0.01 to 0.20% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and further 0.005 to 2.0% by mass in the sum total of at least one element selected from the group consisting of 0.005 to 0.3% by mass of Ag, 0.005 to 2.0% by mass of Co and 0.005 to 0.2% by mass of Cr, and less than 0.005% by mass (including 0% by mass) of S, with the balance being made of Cu and inevitable impurities,

wherein a diameter of a crystal grain in the alloy is from more than 0.001 mm to 0.025 mm; and the ratio (a/b), between a longer diameter a of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter b of a crystal grain on a cross section perpendicular to the direction of final plastic working, is or less 1.5,

wherein the alloy has a tensile strength of 800 N/mm² or more, and